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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/889,370	07/17/2001	Stephen Ivor Hall	HALL-00108	2963

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09/08/2004

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EXAMINER

MCHENRY, KEVIN L

ART UNIT	PAPER NUMBER
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1725

DATE MAILED: 09/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/889,370

Applicant(s)

HALL ET AL.

Examiner

Kevin L. McHenry

Art Unit

1725

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 17-32 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 17, 18 and 20-28 is/are rejected.
- 7) ☒ Claim(s) 19 and 29-32 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 July 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 17 and 19-21 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-3 of U.S. Patent No. 6,548,027 in view of Birmingham et al. (U.S.P. 4,954,320).

Claims 1-3 of U.S.P. 6,548,027 teach all of the cited structures of claims 1 and 19 21 of the present application except that claim 1 does not teach the use of a bed of dielectric material.

Birmingham et al. teach a reactive plasma bed that includes a dielectric packing. Birmingham et al. teach that this arrangement allows plasma to be driven to higher energy states and allows sufficient electron energy and density to insure the efficient decomposition of toxic vapors, gases, and aerosols as well as ozone. (See U.S.P. 4,954,320; column 2, lines 23-41).

It would have been obvious to one of ordinary skill in the art at the time that the applicant's invention was made to have modified the claims of U.S.P. 6,548,027 by the teachings of Birmingham et al. One would have been motivated to do so in order to

allow plasma to be driven to higher energy states and allow sufficient electron energy and density to insure the efficient decomposition of toxic vapors, gases, and aerosols as well as ozone, as taught by Birmingham et al.

Drawings

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 16. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 17, 21-24, and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Birmingham et al. (U.S.P. 4,954,320).

Birmingham et al. teach a plasma reactor for processing gaseous media that includes a dielectric reactor bed in the shape of a cylinder, conduits for passing a gaseous medium through the bed, an alternating power supply unit for applying a potential across the bed to generate a discharge. Birmingham et al. show that the power supply is connected to an inner, non-permeable electrode and that an outer non-permeable electrode is connected to the power source and ground potential. The power source operates at a frequency of 0.5 kHz to 40 kHz and a voltage of 4 kV to 28 kV and above. Birmingham et al. show the reactor bed and power source with no items or structures in between. The power supply includes an AC generator that is connected to the primary windings of a transformer. The bed can be in the form of granular, tubular, ring, spheroidal or spherical, fibrous, or aggregate form. The power supply includes solid state fast tuning and is capable of matching its frequency to the resonant frequency of the electrical circuit, including the bed. (See U.S.P. 4,954,320; Figures 1 and 2; column 2, lines 23-41, 67, 68; column 3, lines 1-15; column 4, lines 31-52; column 5, lines 6-22, 51-68; column 6, lines 1-17, 67-66).

The examiner notes that the cited language “adjacent” for describing the position of the power source in relation to the bed is broad and that the teachings of Birmingham et al. read upon this cited feature in the broadest sense of the claims.

6. Claims 17, 18, 22, 23, and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamamoto (U.S.P. 5,609,736).

Yamamoto a plasma bed for processing gaseous media that includes a dielectric bed, conduits for flowing a gaseous medium through the bed, and a power supply unit for generating an electric potential across the bed to produce a discharge. Yamamoto show the reactor bed and power source with no items or structure in between. The bed may be in the form of pellets and may . This reference teaches an embodiment in which the bed is composed of electrodes that are spaced apart and coated with dielectric material. A pulsed or alternating voltage power supply may be used. Yamamoto teaches that this system may be used to control emissions in the automotive industry. (See U.S.P. 5,609,736; Figures 1A, 1B, 4; column 2, lines 8-23, 45-63; column 3, lines 10-23; column 4, lines 3-37, 56-67; column 6, lines 1-9, 27-29; column 8, lines 52-63).

The examiner notes that the cited language "adjacent" for describing the position of the power source in relation to the bed is broad and that the teachings of Birmingham et al. read upon this cited feature in the broadest sense of the claims.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 20 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Birmingham et al. (U.S.P. 4,954,320) as applied to claims 17, 21-24, and 26 above, and further in view of Bayliss et al. (U.S.P. 5,440,876).

Birmingham et al. teach the reactor noted above in section 5. However, Birmingham et al. do not teach that the reactor is used for an internal combustion engine or that the electrodes are both gas permeable.

Bayliss et al. teach a dielectric plasma reactor for internal combustion engines. Bayliss et al. teach an embodiment in which the bed is contained between inner and outer gas permeable electrodes. Bayliss et al. teach that this setup is useful for diesel engine exhaust. (See U.S.P. 5,440,876; Figure 2; column 3, lines 29-56).

It would have been obvious at the time that the applicant's invention was made to have modified the reactor noted above by the teachings of Bayliss et al. One would have been motivated to do so in order to provide a suitable reactor to handle diesel engine exhaust, as taught by Bayliss et al.

9. Claims 25, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Birmingham et al. (U.S.P. 4,954,320) as applied to claims 17, 21-24, and 26 above, and further in view of Williamson et al (U.S.P. 5,695,619).

Birmingham et al. teach the reactor noted above in section 5. However, Birmingham et al. do not teach that the means for controlling the frequency of the electrical circuit is an inductor in parallel with the reactor bed circuit, that the reactor is used for an internal combustion engine exhaust system, or that the reactor is controlled in response to engine speed.

Williamson et al. teach a pollutant reactor that includes a control means with an inductor in parallel with the reactor bed circuit. Williamson et al. teach that this setup uses less energy while maintaining its pollution processing capabilities. Williamson et

al. also teach that the reactor energization can be controlled in response to engine acceleration. (See U.S.P. 5,695,619; column 1, lines 66, 67; column 2, lines 1-36).

It would have been obvious to one of ordinary skill in the art at the time that the applicant's invention was made to have modified the reactor noted above by the teachings of Williamson et al. One would have been motivated to do so in order provide a reactor that uses less energy while maintaining its pollution processing capabilities, as taught by Williamson et al.

Allowable Subject Matter

10. Claims 19 and 29-32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter: the instant application is deemed to be a nonobvious improvement over the invention of Birmingham et al. (U.S.P. 4,954,320). The improvements comprise enclosing the bed and power supply in an electrically conductive enclosure that is at ground potential; driving the ac generator by the engine via a constant speed drive system.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sikich (U.S.P. 3,979,193), Wang et al. (U.S.P. 5,927,069), and

Henkel (U.S.P. 5,044,157) are cited of interest for illustrating the state of the art in dielectric bed reactors.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin L. McHenry whose telephone number is (571) 272-1181. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas G. Dunn can be reached on (571) 272-1171. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Kevin McHenry

KILEY S. STONER
PRIMARY EXAMINER

 9/7/04